CLAIMS

1. A mouthguard to protect an arch of a user comprising:

an outer wall covering a buccal surface a tooth, wherein said outer wall includes a force absorbing inner layer, a force absorbing outer layer and a force transmitting layer positioned therebetween said force absorbing inner layer and said force absorbing outer layer;

an inner wall opposite said outer wall covering a palatal surface of the tooth, wherein said inner wall includes said force absorbing inner layer and said force absorbing outer layer; and

a lower wall disposed between said outer wall and said inner wall covering an occlusal surface of the tooth, and said outer wall, inner wall and lower wall form a U-shaped channel that is molded in the shape of the arch, wherein said lower wall includes said force absorbing inner layer and said force absorbing outer layer.

2. A mouthguard as set forth in claim 1 wherein said force transmitting layer includes of a plurality of longitudinally extending fibers disposed in a resinous matrix.

3. A mouthguard as set forth in claim 1 further comprising a palate protective wall extending radially from an edge of said inner wall, wherein said palate protective wall conforms to a shape of a palate of the user.

4. A mouthguard as set forth in claim 1 wherein said force absorbing inner layer and force absorbing outer layer are made from a class of materials approved for dental use having resilient, moldable, and settable properties.

5. A mouthguard as set forth in claim 4 wherein said force absorbing inner layer includes a chemical additive enabling the material to be rigid below a first predetermined temperature and moldable above a second predetermined temperature that is greater than the first predetermined temperature.

6. A mouthguard as set forth in claim 4 wherein said force absorbing inner layer material includes a gas-liberating chemical additive that is selected from a class of additives that is chemically reactive upon the application of heat to liberate air bubbles that become trapped in the force absorbing inner layer material.

7. A mouthguard as set forth in claim 1 wherein said force transmitting layer is made from a composite material selected from a class a materials approved for dental use having force transmitting properties.

8. A mouthguard as set forth in claim 7 wherein said composite force transmitting material includes a plurality of long fibers embedded in a resin matrix.

9. A mouthguard as set forth in clam 8 wherein said fibers are selected from a class of material that includes glass fibers, or carbon fibers or quartz fibers.

10. A mouthguard as set forth in claim 8 wherein said resin matrix is selected from a class of resinous materials including an epoxy resin, or a polyester resin or an acrylic resin.

11. A mouthguard as set forth in claim 7 wherein said force transmitting layer is formed as a strip.

12. A mouthguard as set forth in claim 11 wherein said strip is preformed.

13. A mouthguard to protect an arch of a user comprising:

an outer wall covering a buccal surface a tooth, wherein said outer wall includes a force absorbing inner layer and a force absorbing outer layer made from a class of materials approved for dental use having resilient, moldable, and settable properties, and a

force transmitting layer positioned therebetween said force absorbing inner layer and said force absorbing outer layer made of a plurality of longitudinally extending fibers disposed in a resinous matrix;

an inner wall opposite said outer wall covering a palatal surface of the tooth, wherein said inner wall includes said force absorbing inner layer and said force absorbing outer layer; and

a lower wall disposed between said outer wall and said inner wall covering an occlusal surface of the tooth, and said outer wall, inner wall and lower wall form a U-shaped channel that is molded in the shape of the arch, wherein said lower wall includes said force absorbing inner layer and said force absorbing outer layer.

14. A mouthguard as set forth in claim 13 further comprising a palate protective wall extending radially from an edge of said inner wall, wherein said palate protective wall conforms to a shape of a palate of the user.

15. A mouthguard as set forth in claim 13 wherein said force absorbing inner layer includes a chemical additive enabling the material to be rigid below a first predetermined temperature and moldable above a second predetermined temperature that is greater than the first predetermined temperature.

16. A mouthguard as set forth in claim 13 wherein said force absorbing inner layer material includes a gas-liberating chemical additive that is selected from a class of additives that is chemically reactive upon the application of heat to liberate air bubbles that become trapped in the force absorbing inner layer material.

17. A mouthguard as set forth in clam 13 wherein said fibers are selected from a class of fiberous material includes glass fibers, or carbon fibers or quartz fibers.

18. A mouthguard as set forth in claim 13 wherein said resin matrix is selected from a class of resinous materials including an epoxy resin, or a polyester resin or an acrylic resin.

19. A mouthguard as set forth in claim 13 wherein said force transmitting layer is formed as a strip.

20. A mouthguard as set forth in claim 19 wherein said strip is preformed.

21. A method of making a mouthguard for a user, said method including the steps of:

casting a model of a user's arch;

molding a force absorbing inner layer of material to the model to form a force absorbing inner layer of the mouthguard;

molding a force-transmitting layer of material over the force absorbing inner layer in a predetermined position, wherein the force transmitting layer includes a plurality of longitudinally extending fibers disposed in a resinous matrix;

molding a force absorbing outer layer of material over the force absorbing inner layer and force transmitting layer to form a mouthguard having an inner wall covering a palatal surface of a tooth, an outer wall opposite inner wall covering a buccal surface of the tooth and a lower wall disposed therebetween the inner wall and outer wall covering an occlusal surface of the tooth; and

finishing the mouthguard to conform to the arch of the user.

22. A method as set forth in claim 21 further comprising the step of using a sizing device to determine the size of mouthguard to use, wherein said sizing device includes a u-shaped bite member having a handle extending from an edge, and a plurality of arch shapes indicated on a surface of the bite member corresponding to a mouthguard size.

23. A mouthguard as set forth in clam 21 wherein said fibers are selected from a class of fiberous material including glass fibers, or carbon fibers or quartz fibers.

24. A mouthguard as set forth in claim 21 wherein said resin matrix is selected from a class of resinous materials including an epoxy resin, or a polyester resin or an acrylic resin.